

## SCIENCE

# Reversing Course on Beavers

By JIM ROBBINS    OCT. 27, 2014

BUTTE, Mont. — Once routinely trapped and shot as varmints, their dams obliterated by dynamite and bulldozers, beavers are getting new respect these days. Across the West, they are being welcomed into the landscape as a defense against the withering effects of a warmer and drier climate.

Beaver dams, it turns out, have beneficial effects that can't easily be replicated in other ways. They raise the water table alongside a stream, aiding the growth of trees and plants that stabilize the banks and prevent erosion. They improve fish and wildlife habitat and promote new, rich soil.

And perhaps most important in the West, beaver dams do what all dams do: hold back water that would otherwise drain away.

“People realize that if we don't have a way to store water that's not so expensive, we're going to be up a creek, a dry creek,” said Jeff Burrell, a scientist with the Wildlife Conservation Society in Bozeman, Mont. “We've lost a lot with beavers not on the landscape.”

For thousands of years, beavers, which numbered in the tens of millions in North America, were an integral part of the hydrological system. “The valleys were

filled with dams, as many as one every hundred yards,” Mr. Burrell said. “They were pretty much continuous wetlands.”

But the population plummeted, largely because of fur trapping, and by 1930 there were no more than 100,000 beavers, almost entirely in Canada. Lately the numbers have rebounded to an estimated six million.

Now, even as hydroelectric and reservoir dams are coming under fire for their wholesale changes to the natural environment, an appreciation for the benefits of beaver dams — even artificial ones — is on the rise.

Experts have long known of the potential for beaver dams to restore damaged landscapes, but in recent years the demand has grown so rapidly that government agencies are sponsoring a series of West Coast workshops and publishing a manual on how to attract beavers.

“We can spend a lot of money doing this work, or we can use beavers for almost nothing,” Mr. Burrell said.

Beavers are ecosystem engineers. As a family moves into new territory, the rodents drop a large tree across a stream to begin a new dam, which creates a pond for their lodge. They cover it with sticks, mud and stones, usually working at night. As the water level rises behind the dam, it submerges the entrance to their lodge and protects the beavers from predators.

This pooling of water leads to a cascade of ecological changes. The pond nourishes young willows, aspens and other trees — prime beaver food — and provides a haven for fish that like slow-flowing water. The growth of grass and shrubs alongside the pond improves habitat for songbirds, deer and elk.

Moreover, because dams raise underground water levels, they increase water supplies and substantially lower the cost of pumping groundwater for farming.

And they help protect fish imperiled by rising water temperatures in rivers. The deep pools formed by beaver dams, with cooler water at the bottom, are

“outstanding rearing habitat for juvenile coho salmon,” said Michael M. Pollock, a fish biologist with the National Oceanic and Atmospheric Administration in Seattle, who has studied the ecological effects of beaver dams for 20 years.

Restoration is not usually as simple as bringing beavers in; if left unchecked, they can do serious damage. Here in Butte, for example, beavers constantly dammed a creek where it ran through a culvert under a pedestrian walkway, flooding nearby homes and a park.

Enter the “beaver deceiver.” Beavers have evolved to respond to the sound of running water by trying to stop it, because their survival depends on a full pond. (A Yellowstone National Park biologist reported that when he briefly kept a beaver in his basement with plans to reintroduce it to a local stream, it kept frantically clawing at its cage to reach the sound of a flushing toilet.) So local officials installed the deceiver, a large wooden frame covered with stout metal mesh that blocks beavers’ access to the culvert but allows water to keep flowing. Even if they try to dam up the box, the water will still flow, and eventually they give up and move on.

Meanwhile, big, prized cottonwoods and other trees are being wrapped in wire or covered with paint that contains sand to prevent beavers from gnawing them.

In some other places, humans are building beaver dams minus the beavers. On Norwegian Creek, a tiny thread of a stream that flows through the rolling grassy hills on a cattle ranch near Harrison, Mont., volunteers came together recently to build a series of small structures from willow branches to slow the flow of water that had been eroding the banks to a depth of 10 feet or more. In just a year the stream bed has risen three feet, Mr. Burrell said, and in a couple more years it could be entirely restored at virtually no cost.

New dams, even natural ones, can have unintended consequences. Julian D. Olden, an ecologist at the University of Washington, has studied new beaver ponds in Arizona and found that they were perfect for invasive fish such as carp, catfish and bass to displace native species.

“There’s a lot of unknowns before we can say what the return of beavers means

for these arid ecosystems,” he said. “The assumption is it’s going to be good in all situations,” he added. “But the jury is still out, and it’s going to take a couple of decades.”

***Correction: October 30, 2014***

An article on Tuesday about the use of beavers and their dams as a defense against the effects of a changing climate referred incorrectly to the dams. They create separate ponds in which the animals build their lodges. The dams themselves are not the beavers’ lodges.

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